What is claimed is:

1. A dual polarization transmission receiving system for canceling cross-polarization interference, comprising:

reception means including two RF local oscillators which receive signals transmitted by using two orthogonal polarized waves (V and H polarized waves) and convert the respective received signals into IF (Immediate Frequency) signals; and

demodulation means for branching each IF signal into two paths, and then demodulating the respective IF signals for each polarized wave by a digital coherent detection scheme, wherein

said demodulation means for each polarized wave extracts a phase noise component from a demodulated output signal, divides the component into DC and AC components, and suppresses a phase noise amount received from an RF local oscillator for an orthogonally polarized wave (different polarized wave) relative to a polarized wave (self polarized wave) as a compensation target in said demodulation means for each polarized wave by using a phase control signal obtained by interchanging the DC and AC components between the respective polarized waves.

2. A system according to claim 1, wherein said

two RF local oscillators are synchronized at the same frequency by a common reference oscillator with a redundant arrangement.

3. A system according to claim 1, wherein said demodulation means extracts a phase noise component from a demodulated output signal, divides the component into DC and AC components, and generates the phase control signal by receiving an AC component from said demodulation means for the other polarized wave (V polarized wave or H polarized wave) and interchanging the AC components.

4. A system according to claim 1, wherein said demodulation means comprises:

a common IF local oscillator which frequency-converts each of the branched IF signals;

two A/D converters which convert the respective frequency-converted signals into digital signals;

two demodulation circuits which demodulate the respective digital signals;

an equalizer which equalizes a waveform of a demodulated signal of a self polarized wave as a compensation target;

an XPIC (Cross-Polarization Interference Cancel r) which generates a replica signal of an

interfer nc component from a different polariz d wave with respect to a demodulated signal on a different polarization side;

an adder which outputs a demodulated signal by adding an error signal output from said equalizer and a replica signal output from said XPIC;

a control circuit which generates an APC (Automatic Phase Control) signal corresponding to a shift of a carrier frequency from the demodulated signal;

a divider which receives the APC signal output from said control circuit and divides the signal into DC and AC components; and

a combiner which outputs the phase control signal obtained by interchanging the DC and AC components between the respective polarized waves.

5. A system according to claim 4, wherein said demodulation means outputs the APC signal, output from said control circuit, to said demodulation circuit which demodulates a self polarized wave digital signal, and also outputs the phase control signal, obtained by combining a DC component output from said divider and an AC component output from said demodulation means for the other polarized wave (V polarized wave or H polarized wave), to said demodulation circuit which demodulates a different polariz d wav digital signal.

6. A dual polarization transmission receiving system comprising:

first and second RF (Radio Frequency) mixers which convert signals transmitted by using two orthogonal polarized waves (V polarized wave and H polarized wave) into IF (Immediate Frequency) signals;

first and second RF local oscillators which are phase-controlled by a common reference signal;

a common IF local oscillator and first and second IF mixers which branch each IF signal into two paths and perform digital coherent detection for each of the IF signals for each polarized wave;

first and second A/D converters which convert the respective signals having undergone digital coherent detection into digital signals;

first and second demodulation circuits which demodulate the respective converted signals;

an equalizer which equalizes a waveform of a demodulated signal of a polarized wave (self polarized wave) as a compensation target;

an XPIC (Cross-Polarization Interference Canceler) which generates a replica signal of an interference component from a different polarized wave with respect to a demodulated signal on a different polarization sid relativ to the self polariz d wave;

an adder which outputs a demodulated signal by

adding an error signal output from said equalizer to a replica signal output from said XPIC;

a control circuit which generates an APC (Automatic Phase Control) signal corresponding to a shift of a carrier frequency from the demodulated signal and outputs the signal to said first demodulation circuit on the self polarization side;

a divider which divides the APC signal into DC and AC components; and

a combiner which generates a phase control signal by interchanging an AC component output from a divider for the other polarized wave between the two polarized waves, and outputs the signal to said second demodulation circuit on the different polarization side.

7. A local oscillator phase noise reduction method for a dual polarization transmission receiving system, comprising:

the first step of converting signals transmitted by using two orthogonal polarized waves (V polarized wave and H polarized wave) into IF (Immediate Frequency) signals;

the second step of branching each IF signal into two paths and then demodulating each of the IF signals for each polarized wave by a digital coherent det ction sch me;

the third step of extracting a phase noise

component from the demodulat d output signal and dividing the component into DC and AC components;

the fourth step of generating a phase control signal by receiving an AC component of the other polarized wave and interchanging the AC components between the two polarized waves; and

the fifth step of generating a replica signal of an interference component from a different polarized wave for a demodulated signal on a different polarization side relative to a self polarized wave on the basis of the phase control signal in order to suppress a phase noise amount received from an orthogonally polarized wave (different polarized wave) relative to a polarized wave (self polarized wave) as a compensation target.

8. A method according to claim 7, wherein

the second step includes:

the step of frequency-converting each of the branched IF signals;

the step of converting the respective frequency-converted signals into digital signals;

the step of demodulating the respective digital signals;

the step of performing waveform equalization of a demodulated signal of a s lf polarized wave as a compensation target;

the step of generating a replica signal of an interference component from a different polarized wave with respect to a demodulated signal on a different polarization side; and

the step of outputting a demodulated signal by adding an error signal based on the waveform equalization and the replica signal, and

the third step includes:

the step of generating an APC (Automatic Phase Control) signal corresponding to a shift of a carrier frequency from the demodulated signal; and

the step of dividing the APC signal into DC and AC components.